

## Book Reviews

*Ecology and Conservation of Owls. 2002.* Edited by Ian Newton, Rodney Kavanagh, Jerry Olsen and Iain Taylor. CSIRO, Melbourne. ISBN 0 643 06794 9. Pp. 363. RRP \$99.

The value of holding international conferences in Australia is that our native research can be compared to the contributions from abroad. Such was the case at *Owls 2000*, a symposium that brought together a small vibrant band of Australian owl researchers with some of the finest from Europe and America along with a small number from southern Asia. This book presents some of the papers presented. It is a seminal work presenting original data and reviews and, unlike some proceedings, has lost nothing in the three year wait to publication.

The first comparison is between Australia and the northern hemisphere is with numbers. Presumably, in the long northern winter, Finns get used to working in the dark. That is the only explanation I can find for their owlish energy. The paper on owl movements by Saurola draws on data from 30,000 nests sites, 80% of them nest boxes erected specially for owls in intensively-logged forest, that are checked annually in Finland. From these nearly 200,000 owls have been banded from which there have been over 25,000 recoveries. Forsman reports briefly on the behaviour of nearly 1,500 Northern Spotted Owls, a species rare enough to impede the logging industry in half the USA, including over 300 with radio transmitters. I suspect the total for the whole of Australia would be fewer than 1,000 banded with a handful of returns.

The quantity of data on owls across the boreal forests allows sophisticated analysis of demography. One example is Newton's opening paper in which he reviews the relationship between owls and their fluctuating prey, how one suite of owls is sedentary with fecundity fluctuating with prey availability and another is highly mobile, breeding wherever prey is abundant. Such a review draws on a wealth of research, rich in both data and resources, that is currently beyond Australian resources.

The other major comparison is in the sophistication of some of the research. Another influential owlish Finn, Korpimäki, has, with colleagues, been able to use the access to numerous owls to determine the role of blood parasites on reproductive success in Tengmalm's Owl while van den Burg looked at infertility rates in Dutch Barn Owl eggs using fluorescence microscopy to locate excess sperm. I suspect most Australian researchers are usually content to candle an egg to check for fertilization. Taylor, one of the few owl researchers to work in both hemispheres, could draw on 20 years of Barn Owl observations to assess the quality of individual breeding sites.

By contrast the Australian papers have an emphasis on the knowledge required immediately for practical conservation management. A suite of papers by

Kavanagh, Loyn, and many others examine the abundance and diet of the large forest owls of south-east Australia for which timber extraction has provided an imperative for research. Data are provided in the form of calling frequency and prey remains rather than details on individually studied birds. The results are encouraging for the owls, and suggest that the conservation battles of the last two decades have produced a set of negotiated protocols that do indeed allow the owls to persist in logged forest for at least the medium term. Powerful Owls are so adaptable that they have occupied the suburbs of Australia's three largest cities, although, as Cooke and others describe, building a boardwalk beneath the nesting tree is not the best way to ensure nesting success.

Less optimistic are the surveys for owls in the woodlands for which the conservation values, and intensity of threat, have been recognised more recently. Powerful Owls are sparse but Barking Owls are non-existent over much of their former range as Taylor and others show for Victoria and Liddelow and others demonstrate for south-west Australia. Similarly Mooney shows that Masked Owls are far less common than might be imagined in Tasmania, being a species of the threatened dry eastern forest rather than the more emotive west. In many ways these owls suffer the intrinsic problems of the many island owl species described by Debus in an useful review of the status of owls in Australasia, or the Lanyu Scops Owl whose use of landscape is analysed by Severinghaus. None, however, are as scarce as the Forest Owlet of Maharashtra, India, which Ishtiaq and others found to have just seven pairs on two diminishing islets of forest in a rising tide of hungry farmland.

One comforting pair of papers examines the effect of rodenticides on owls. Madden, of Bayer chemicals, reviews use of the first generation multidose poison Racumin and concludes that only one of four studies showed any deleterious effects on the studied raptor and that was not outwardly apparent. Newton meanwhile, who has no real or apparent conflict of interest, concludes that even the second generation rodenticides, some of which are banned in Australia, killed only 2% of all dead Barn Owls examined, although over a quarter had evidence of contact with the poisons.

In all, this book is a major achievement for owl research in Australia, and the Australasian Raptor Association, which organised the conference. Production and editing standards are high, the organisation of papers is sensible and the quality of the material is excellent.

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**Feed or Feedback. 2003. By Duncan Brown. International Books, distributed in Australia by Bush Books. RRP US\$29.95**

Life on earth is governed by great global biogeochemical cycles. The importance of these cycles was driven home to me in trying to understand climate change. My simple conception of how we have ended up in the mess we are now trying to remedy is as follows. Over millennia, much of the Earth's carbon took the form of small creatures which in concentrations subject to heat and pressure turned into fossil fuels. Before the Industrial Revolution that began in the 18<sup>th</sup> century, these deposits were safely stored underground (as coal, oil and natural gas) and the Earth's carbon was distributed in rough equilibrium in these deposits, in the soils and vegetation, in the oceans and as carbon dioxide in the atmosphere. The cycling of this carbon was pretty stable in the scale of human history.

With their massive industrial activity, however, humans have disrupted this great cycle by digging up black stuff (coal and oil, and increasingly gas), burning it and venting the carbon into the atmosphere, which now acts as a vast and overloaded waste sink. It is expected that in a couple of decades the amount of CO<sub>2</sub> in the atmosphere will double, compared to pre-industrial levels, and possibly treble before action we take has any effect. This will have dire consequences, especially for vulnerable ecosystems like those in Australia and vulnerable people, especially in the Third World. Millions will die. These concerns have been reinforced by a recent report from, of all places, the Pentagon which considers the potentially catastrophic security implications of abrupt climate change. It suggests that we in Australia are "likely to build defensive fortresses" around our country to protect our resources from desperate outsiders and aggressive states created by rapid and unpredictable climate change.

In this book, Duncan Brown – for many years a professor of biology at the University of Wollongong – tells an alarming story about another of the six great biogeochemical cycles involving elements central to life, that of phosphorous. For this reviewer, the relentless logic of the book is frightening and it is suggested that readers do not pick up this book unless willing to be scared.

The essential message of Brown's book is that urban sanitation and soil degradation are not separate environmental problems but components of a much larger one. Modern agriculture and sewage disposal are part of a cycle, except that the cycle has become a linear system that threatens to make life very miserable. Brown tracks the flow of nutrients – and especially phosphorous – from the mines to the oceans, detouring through pasture and crop land and the guts of city dwellers and their sewage pipes. In fact, as I read, I thought this book could be subtitled *The Secret Life of Turds*.

Readers will recognise that the story is also one about entropy: by mining reserves of phosphorous and dispersing them throughout the oceans our economy

turns useful concentrations of minerals and energy into useless deposits. The only solutions are much more recycling – which requires vast amounts of cheap clean energy, if we had it – or, horror of horrors, consuming much less. In contrast to the carbon cycle, sharp reductions in consumption are much less easy in the case of phosphorous because most of it goes into food production (which we need) rather than BMWs or air conditioning (which we can do without).

Here the carbon and phosphorous cycles interact, because the whole process of converting phosphorous from useful to useless involves a great deal of transport, and transport means energy, which means burning fossil fuels. Thus disruption of the phosphorous cycle also means disruption of the carbon cycle, and not just in Australia. The CO<sub>2</sub> we emit today will end up on the other side of globe in a week or so. And, as Brown points out, much of the phosphorous we mine and use in agriculture we then send overseas. Brown estimates that we export around 60,000 tonnes of phosphorous embodied in food each year so that Australian phosphorous is dispersed, via the world's sewage systems, into oceans around the globe.

Sooner or later we must run out of usable phosphorous; Brown suggests that will happen probably within a century and certainly within two. Then what do we do? As we must take in phosphorous to survive, basically, we are stuffed; all we can do is minimise our consumption of phosphorous and hope that the development of very cheap, abundant and renewable energy will allow us to recycle a large portion of elemental phosphorous in order to slow down entropy and keep the race going.

This book then is an extended meditation on the problem of ecology – we live in a global system and what we each do affects the whole world – and about sustainability and will perhaps be read by many people who are interested in that subject.

But I fear that, as in the case of climate change, only those willing to be clear-eyed about the future will be suitably scared by the message of this book. The general public won't be scared, and nor will our political decision-makers. Humans have a well-honed capacity to filter out the 'too hard', especially if it is a long way off, that is, more than ten years into the future. Perhaps we are hardwired to ignore looming threats.

If nothing else, the role of environmentalists is to remind us again and again that the future is approaching and we should plan for it, in contrast to the economists who find comfort in the belief that the future will look after itself, that one way or another the market will deliver. It is hard to see how the market will help if we run out of phosphorous; it certainly has not rescued us from climate change. In fact the market – in the form of the fossil fuel lobby – has been the greatest obstacle to taking action to stop climate change.

If there is a criticism I would make of this otherwise admirable book, it is when Brown turns his attention at the end to political economy. Too many scientists are prone to venture political views that, while well-meaning, appear naïve and ill-considered. So when Brown says the only hope is for us all to live in small autonomous villages, he does more harm than good to the cause. For that is clearly not going to happen; it is impossible and can only immobilise people who can see the problem that he has so clearly laid out.

*Feed or Feedback* has been acclaimed abroad, with praise coming from renowned experts such as David Pimentel, Robert May, David Ehrenfeld, Peter Singer, Jan Pronk and even John le Carre. For no other reason than to avoid embarrassment when travelling abroad, Australian scientists, environmentalists and policy makers should be familiar with this important book. And those teaching in the natural and environmental sciences could do no better than to prescribe this book as a means of teaching the principles of ecology.

Clive Hamilton

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***Predators with Pouches, the Biology of Carnivorous Marsupials.* 2003. Editors: M. Jones, C. Dickman and M. Archer. CSIRO Publishing, Collingwood Victoria. Pp. 504. RRP \$185. ISBN 0643066349.**

This book is loosely based on a symposium on carnivorous marsupials held in 1999 by the Australian Mammal Society. It sets out to give an up to date biological overview of carnivorous marsupials from both Australasia and America (yes, they have marsupials over there too). *Predators with pouches, the biology of carnivorous marsupials* is divided into five chapters: Evolution and systematics, Reproduction and development, Physiology, Evolutionary ecology and behaviour, and finally Conservation. This 500-page volume is a collection of 33 invited review articles, meaning that, unlike its two-volume predecessor *Carnivorous Marsupials* published in 1982, it does not comprise the original symposium presentations. These were published in the *Australian Journal of Zoology* and *Wildlife Research*, for those who are interested. The use of review articles has the obvious advantage of giving a broader and arguably more comprehensive overview of what's currently known about these marsupials. It also allowed for the incorporation of articles from specialists, particularly many from South America, who could not attend the conference. Nevertheless, because the various contributions were written independently by different authors with only little consultation between them, omissions and some overlap were unavoidable as it is presumably the case for most edited books. Consequently not all chapters are covered in the same depth, but one wonders whether some of the gaps in some of the traditional fields of biology reflect the somewhat spurious government funding policy for research favouring the newest and most fashionable research fields ("national importance" is the keyword here) or worse, a loss of expertise accomplished by the radical down-sizing of universities not only in Australia.

What can be said about the coverage achieved in the five different chapters applies also to the separate contributions, which vary considerably in quality. If the brief to the authors was to provide a review of a particular topic to be understood by non-specialists, then many did a marvelous job, but a few fell a bit short of the mark. Unfortunately, not all of the contributions are easily accessible and in my opinion some cover a too narrow topic to qualify as a

review. Such lower quality contributions appear to be more abundant in the chapters Evolution and Systematics, and Conservation than elsewhere, but this view may reflect my particular research background and interests.

An important omission from this book is an index, which would have been very useful for readers, but of course this would have been an exceedingly laborious task for one of the presumably unpaid editors or the publisher. As a compensation of some sort the comprehensive introductory chapter contains a short summary of each of the following articles, which should help you in finding the appropriate article on a certain topic.

The editors admit that they couldn't resist the catchy title *Predators with pouches*, although not all marsupials have well defined pouches, not all carnivores are predators and so on. Therefore the subtitle *The biology of carnivorous marsupials*. Despite this qualifier the editors had a hard time in defining what characterises a carnivorous marsupial or which species to include in the book. They acknowledge that the solution to the dilemma is somewhat arbitrary. As a generalisation those marsupials with vertebrates and invertebrates comprising more than 50% of their diet should have been included. It appears, however, that this criterion of 'carnivory' was not applied on a species to species basis, but more likely on the level of orders.

Unlike its predecessor, *Carnivorous marsupials*, which was restricted to Australian fauna, the present volume includes all three extant orders of American marsupials (Didelphimorphia, Paucituberculata, Microbiotheria), although many species are predominantly frugivores as stated in the book itself. As far as Australasia is concerned the orders, Dasyuromorphia (dunnarts, quolls and relatives, numbat and thylacine), and Notoryctemorphia (marsupial moles) are covered, but bandicoots (Peramelemorphia) with their often largely insectivorous diet and some of the insect-eating possums (Diprotodontia) are not included. These taxonomic restrictions were, however, apparently only applied to extant taxa and thankfully not followed by the authors delving in palaeontology. Obviously, many extinct taxa had to be covered and it would have been impossible to exclude the intriguing carnivorous

rat kangaroos or *Thylacoleo carnifex*, the marsupial lion which was probably related to either wombats or possibly pygmy-possums (Diprotodontia). The end result is not quite convincing with a species assemblage partly based on a dietary character trait and/or taxonomic affiliation. The supposedly unifying carnivorous lifestyle often doesn't appear to make much sense. In fact most articles deal with either American or Australian species and the few, which cover both, seem to have difficulties in finding similarities between the vastly different taxa. The combination of American and Australasian taxa obviously did cause some difficulties.

Because the book covers a large variety of extant and extinct species from both America and Australasia, I would have liked to see an illustrated index for at least some characteristic representatives of the different taxonomic groups dealt with. It appears unlikely that all Americans interested in this group of marsupials have an intricate knowledge of Australasian fauna, and the same applies to us down under. Being able to put a face to a name would have been nice, unfortunately very few of the articles make an attempt (or were they discouraged to reduce printing costs?) to illustrate their subjects and only a handful of halftone photographs are provided. Overall the reproduction of the figures could be better. Low resolution scanning or printing is acceptable for simple scatter and line graphs, but didn't do much justice to several of the intricate drawings.

Being only the second publication *Predators with pouches* cannot be as novel and ground breaking as its predecessor, but researchers haven't been idle in the twenty years elapsed since the milestone publication *Carnivorous marsupials*. Alongside advances in the established disciplines of biology new research fields have been explored facilitated by the development of new technologies. Conservation genetics for example would

be one of them. It certainly was time for an update. Given the substantial increase in knowledge and the additional coverage of American marsupials the choice of inviting review articles was probably a good one. The book definitely provides a good starting point for everybody who might have some interest in 'carnivorous' marsupials. However, it will have difficulties attaining the status of a 'reference book', mainly because of the missing index, the apparent gaps in coverage and the less than perfect structure which inherently comes with edited books.

Is the book worth buying? *Predators with pouches* is not exactly cheap. Obviously, this book is written for a niche market, which entails a small print run, and consequently is priced accordingly. As far as the content is concerned, after having completed the daunting task of reading it from cover to cover, I have to say that the book contains a wealth of information and I have learned a lot of new facts. Moreover, many articles are well written, interesting and a pleasure to read. The few less inspiring papers may be annoying, but fortunately they are the minority. Therefore, if you are a scientist working on any Australasian mammal or marsupial specifically and can also tax deduct the purchase, this book is a must as it should be of course for any decent university library. If you are however a student, temporary employed or worse one of the many unemployed academics, go to the library (provided they can afford a copy) and have a read first before you commit yourself. You could copy a few of the articles without losing too much quality. But if you do that remember that the convenience of photocopies is one of the reasons that books like this and also scientific journals have become as expensive as they are.

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### **Growth Fetish by Clive Hamilton, Allen and Unwin, Australia 2003. RRP \$24.95**

There is arguably no more fundamental problem in modern politics than the obsession with growth. Despite attempts beginning with the Club of Rome over thirty years ago to point out the blindingly obvious, that there are always limits to growth in a closed system (Meadows et al 1972), the message still falls on deaf ears. The Brundtland report linking economic development with environmental degradation identified, as one of the two primary drivers of that degradation, unsustainable consumption levels in the affluent world (WCED 1987), yet still economists urge growth. Even when the consequences of growth are serious, such as the recent changes to the global climate (Australian Climate Group 2004), politicians, economists and media analysts still hold the telescope to their blind eye and see no signal. The 2004 report of the International Geosphere-Biosphere Program argued that we now have the capacity to perturb the natural systems of the planet, potentially causing catastrophic changes (Steffen et al 2004), yet we are still urged to consume more resources and even given financial inducements to be profligate by the Howard government.

The second Australian State of the Environment Report said that urban air quality is improving but all of the other serious environmental problems are worsening: the state of our inland rivers, the loss of biological diversity, the state of our rural land, increasing greenhouse gas emissions and so on (ASoEC 2001). It said the fundamental reasons why the problems are worsening are that the pressures on our environment are still increasing: the combined pressures of a growing human population and increasing demands per person. This was a reminder that neither at the local, nor the regional, nor the global scale do we have any convincing strategy for coping with population growth. To the contrary, most decision-makers still show no sign of seeing that population growth is even part of the problem. I've recently been in both South Australia and the Northern Territory where decision-makers publicly lament the fact that their population is either stable or only growing slowly. Most politicians still see population growth either as a desirable end in itself, or as a tribute to their sound management, or an inevitability; the recent draft regional plan for south-east



Queensland begins from the presumption that 1 million more people will crowd into that region in the next twenty years (OUM 2004). It is clear that we can't conceive of a sustainable society in which the population of one species grows without limit. The human population *will* be brought into balance with natural systems, either by starvation, disease, and fighting amongst ourselves, or by civilised social choices. It is clear we ought to be aiming for the civilised choices rather than resigning ourselves to a future in which human lives are again nasty, brutish and short.

Similarly, demands per person have to be stabilised or reduced if we hope to live in a stable society; the needs of the growing population are compounded by increasing resource use per person and increasing waste production per person (SoEAC 1996). Current global consumption already exceeds the sustainable bio-capacity by about 20 per cent (WWF 2004), but the gap between the materially wealthy and the materially poor is growing every year. Instability is increasing. Not only is the gap between rich and poor widening all the time, but the cultural hegemony of the USA, with its ubiquitous film and television, means that the poorer of the world are reminded every day of their material deprivation by being shown the scale of material waste in the richer parts of the world. I don't believe we can be secure doing property deals on our mobile phones in large cars in a world in which the majority of the human population have never ridden in a car, never made a telephone call, and never owned property. A sustainable world has to be a more equitable world.

The Australian Bureau of Statistics hinted at the costs of growth without drawing the conclusion when they launched their report *Measuring Australia's Progress* (ABS 2002). In their headline indicators for the 1990s, they showed that throughout that decade all of the economic indicators were positive, the social indicators were mixed with some very worrying negative trends, and all but one of the environmental trends got worse. In other words, the increasing economic production of Australia has come at social and environmental cost. That report exposed the vacuity of the view, which is still common in Canberra and the commercial media, that all our problems can be solved as long as we have a booming economy. So it is acceptable to trash the environment and create social problems to get wealthy, because then we'll be able to afford to clean up the environment and repair our society. I was present at the Melbourne conference when the ABS tabled their report, showing the social and environmental cost of economic growth in recent years. Within an hour of the presentation, economists and the sort of media analysts who work for the Murdoch press were demanding more rapid economic growth to solve our social and environmental problems!

There is clearly a deep-seated reason for the incapacity of reasonably intelligent people to grasp the problems associated with growth. Inayatullah and Slaughter have developed Causal Layered Analysis as a theoretical framework, mainly for use in futures studies [Inayatullah, 1998; Slaughter, 2002]. CLA analyses issues at four levels: "Litany, Social Causes, Discourse/World View and Myth/Metaphor" [Inayatullah, op cit] or three levels "Pop Futurism", "Problem Oriented" and "Critical and Epistemological" [Slaughter, op cit]. As Kelly [2003] puts it:

The Litany or Pop Futures level is the most common expression of problems or issues. It is often oversimplified, exaggerated and devoid of analysis. The Social Causes level identifies problems and short term causes and offers practical responses, often based at the policy or regulations level...The Discourse level delves deeper and more widely to show how "the discourse we use to understand is complicit in framing the issue" [Inayatullah, op cit]. The fourth layer, Myth/Metaphor, is usually ignored. "These are the deep stories, the collective archetypes, the unconscious dimensions of the problem" [Ibid].

This analytical framework provides insight into intellectual trends as well as specific issues. It is helpful in understanding the durability of the notion that growth is good, that growth is either inevitable or, at least, desirable as the bringer of wealth and happiness. It is one of the deep-seated myths of our society. Challenging it is tantamount to heresy, so the benefits of growth are acclaimed and the costs are ignored. Most discussion in politics and the mass media is at the litany or pop futures level, with an occasional excursion into social causes. The myths remain unrecognised and unchallenged.

Clive Hamilton's book is a devastating critique of what he correctly identifies as the growth fetish. We are constantly being urged, as he says, to use money we don't have to buy things we don't want to impress people we don't like. Richard Slaughter (2004) recently cited Richard Eckersley's insight that the traditional seven deadly sins – pride, lust, greed, envy, laziness etc – have been re-packaged as the marketing imperatives of the modern world. In a morally deficient and spiritually bankrupt society, people are urged to find fulfilment in consumption. That is an extraordinary metonym: the individual as stomach. We don't use resources, we consume them. This metaphor elevates greed from a pardonable human weakness to having almost the status of a virtue. Destroying resources is no longer an indulgence but an economic duty. Consume, be silent, die, comforted in the knowledge that you are helping the economy to grow. As the Twin Towers crumbled on September 11 2001, George Bush urged US citizens to go shopping!

As Hamilton says, the notion of a steady-state economy has a long and respectable intellectual pedigree, stretching back to John Stuart Mill. In recent years, the analysis has been developed and expounded by US economist Herman Daly (1977, 1992). The short-term political appeal of growth is obvious. By giving the feeling of progress and improvement at all levels, it deflates the pressure there would otherwise be for a fairer distribution of wealth. In a steady state, it would be seen as outrageous for Kerry Packer to throw away ten times the lifetime earnings of an average household on a horse race. We are not outraged because the pittance on which a typical single parent survives grows by a minuscule amount each year, thus giving the illusion that in time we will all be rich enough to blow millions of dollars on the Melbourne Cup.

It is clear that growth is now threatening the natural systems on which we depend for life support. It is a matter of urgency to reconceive our social and political institutions to shape a future world of equitable resource use within the sustainable limits of the planet. Hamilton's book is an urgent wake-up call. There is no real prospect of its message being heard by politicians like John Howard, imprisoned in his 1950s view of the world. There is no easy path forward. Politicians like to treat us like naïve children and tell us bed-time stories: trust us, you can pay less tax and have more services, you can increase the population and have more per person. In the real world, there is no magic pudding that keeps replenishing. There are difficult trade-offs to be negotiated – between rich and poor, between urban and rural, between men and women, between this and future generations. These difficult choices will only be politically sustainable if the whole community is involved in the process. That is the pre-eminent challenge to our

institutions. We have to devise structures of governance and community involvement that will allow us to make difficult decisions, taking into account the needs of those who cannot express their preference in today's market or this year's election: all other species and all future generations. But when the people lead, the leaders have to follow. Buy this book, read this book and talk to others about its important message. The survival of human civilisation depends on us developing beyond the primitive notions that bigger is better, that growth is not just tolerable but desirable or even essential, and that faster growth is better than slower growth. These delusions were not a problem when our numbers were small and our demands limited. The growth of the past means that future growth is now threatening the survival of civilised society. It is impossible to over-state the urgency of our situation. Clive Hamilton has done us a favour by writing this clear and compelling book.

Ian Lowe

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**Killers in Eden. 2002. Danielle Clode. Allen & Unwin, Crows Nest. Pp. 190. RRP \$24.95.**

Like Danielle Clode I too have spent many hours watching the water hoping that I might get a glimpse of the Twofold Bay killer whales. Unfortunately I have just missed out on seeing them on a couple of occasions. Killer whales began abandoning Twofold Bay in the late 1800s and are now rarely seen in southern NSW waters. In 1840 there were as many as 30 killer whales frequently seen in Twofold Bay during the whaling season. In 1902 only seven remained. By 1923 only three remained, until finally there was only one whale - 'Old Tom' who returned alone annually until he was found dead in Twofold Bay in 1930.

The killer whales of Twofold Bay preyed on baleen whales, mainly humpback, minke and blue whales. The killer whales would assist the Eden whalers in landing their catch by herding the baleen whales into the shallower waters of Twofold Bay making it easier for the men to harpoon the large whales. In return they were allowed to feast on the tongue. In 1840s shore based whalers in Eden were landing a whale a day throughout the season

(sometimes as many as eight whales per day). By end of 19<sup>th</sup> century, 20 whales for season was a good result. This decrease in prey availability is probably the main reason the killer whales began to abandon the area.

The killer whales' association with the whalers of Eden is a remarkable story and one that has been told many times. In this book, however, Danielle Clode digs deeper into the story attempting to separate fact from fiction. She sorts through historic records dating back to 1840's and compares these historical accounts with what we know now about the biology of killer whales.

Clode explores the mystery surrounding Old Tom's Age. Local estimates were that Old Tom was 80 - 90 years old when he died; that is doubtful considering the average life span of a male killer whale is 40 years. A more plausible estimate of Tom's Age is 60 years, which is supported by George Davidson, a local whaler who had a close relationship with Tom. Davidson recalls Tom being

around when he first began whaling in 1878. However, analysis of the dentine growth layers in 1977 revealed that 'Old Tom's' skeleton on display in the Eden Killer Whale Museum was that of a 35 year old killer whale as reported by Mitchell and Baker (1980). Clode goes on to explore possible errors associated with ageing whales using dentine growth layers. This book also casts doubts on another part of the Old Tom tale, suggesting that the wearing down of Tom's front teeth may have resulted from a natural tooth-wear pattern and not from him towing harpoon lines in his mouth as local folklore suggests.

The book comprises nine chapters. Chapter 1 'The family album' brings together all the information on each individual killer whale known at Eden – something that has not been done in the literature before. Chapter 2 'Demon dolphins' deals with whale evolution, their distribution and the attraction of the killer whales to Twofold Bay. Chapter 3 'The baleen and blubber boom' focuses on the history of European whaling in Eden. Chapter 4 'Old Tom' tells the story of the best known of the killer whales- Old Tom who has been immortalized in Eden folklore. I particularly liked Chapter 5 'A matter of taste' which details human-killer whale interactions, the changing attitudes of humans towards killer whales and killer whales' affinity with humans. Chapter 6 'an eclectic palate' – details the diverse and specialized hunting techniques of different populations of killer whales including the co-operative hunting techniques of

killers that specialize on baleen whales, the killers of the Crozet Archipelago pod which drive themselves up on the shore to snatch elephant seal pups and the 'carousel feeding' techniques of the Norwegian killers which hunt herring. Chapter 7 'A family affair' deals with the family structure and social-bonds of killer whale pods. Chapter 8 'Partners in crime' - talks about the association between man and the killer whales of Eden. Finally, Chapter 9 'The keeper of souls' discusses the spiritual and emotional bond between aboriginal people and the Eden killer whales.

One only has to spend a short time in Eden to realise how important the story of the killer whales assisting the Eden whalers is to local culture. Apart from whale watching, Eden's major tourist attraction is the Eden Killer Whale Museum with its focal point being Old Tom's skeleton. The story that Danielle Clode tells may not be as romantic as local legend. Maybe Old Tom didn't grasp harpoon lines in his mouth but nevertheless the 'real' story is no less remarkable. There is no doubt that the killers in Eden formed a unique partnership with the whalers of Twofold Bay – A human-animal relationship rarely seen. I recommend this book to anyone with an interest in cetaceans and/or human – animal interactions.

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## References

Mitchell, E. and Baker, A. N. 1980. Age of reputedly old killer whale, *Orcinus orca*, 'Old Tom' from Eden, Twofold Bay, Australia. *Reports of the International Whaling Commission* (Special Issue 3): 143.

**Editorial Note:** This book is somewhat controversial in Eden. The Eden Killer Whale Museum's Committee refuses to sell it in their gift shop.